

# Solutions to Solving Rational Inequalities

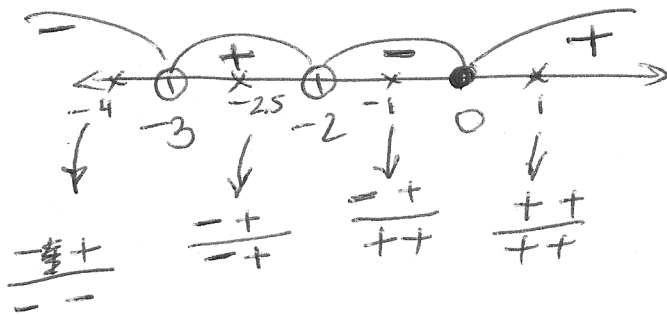
①

$$\frac{2x^3 + 4x}{x^2 + 5x + 6} < 0$$

$$\frac{2x(x^2 + 2)}{(x+2)(x+3)} < 0$$

zeros:  $\frac{2x}{x^2+2}=0$   
 $\boxed{x=0}$   $\frac{x^2+2}{x^2-2}=0$   
 $\emptyset$

Undefined:  $\frac{x+2}{x+3}=0$   
 $\boxed{x=-2}$   $\boxed{x=-3}$



$\neq \boxed{<0} \rightarrow$  negatives, not including zeros  
 $(-\infty; -3) \cup (-2, 0)$

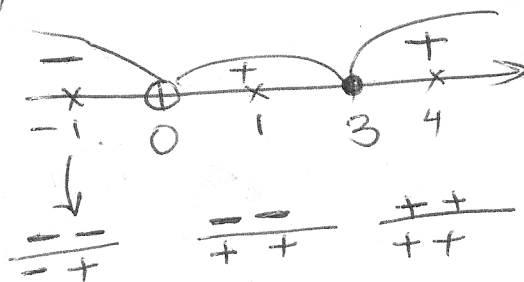
②

$$\frac{x^2 - 6x + 9}{3x + 6x^3} \leq 0$$

$$\frac{(x-3)(x-3)}{3x(1+x^2)} \leq 0$$

zeros:  $\frac{x-3}{1+x^2}=0$   
 $\boxed{x=3}$   $\frac{x^2-1}{x^2+1}=0$   
 $\emptyset$

Undefined:  $\frac{3x}{1+x^2}=0$   
 $\boxed{x=0}$



$\boxed{\leq 0} \rightarrow$  negatives + zeros

$(-\infty, 0) \cup \{3\}$

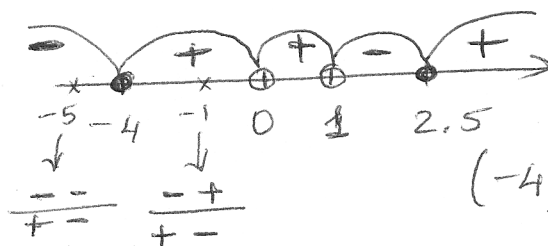
③

$$\frac{2y^2 + 3y - 20}{y^3 - y^2} > 0$$

$$\frac{(2y-5)(y+4)}{y^2(y-1)} > 0$$

zeros:  $\frac{2y-5}{y^2(y-1)}=0$   
 $\boxed{y=2.5}$   $\boxed{y=-4}$

Undefined:  $\frac{y+4}{y^2(y-1)}=0$   
 $\boxed{y=0}$   $\boxed{y=1}$



$\boxed{>0} \rightarrow$  positives only

$(-4, 0) \cup (0, 1) \cup (2.5, \infty)$